

STATE OF NEW MEXICO  
BEFORE THE SECRETARY OF ENVIRONMENT


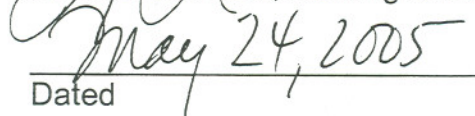
IN THE MATTER OF REQUEST FOR A CLASS  
3 PERMIT MODIFICATION FOR CORRECTIVE  
MEASURES FOR THE MIXED WASTE LANDFILL No. HWB 04-11(M)  
SANDIA NATIONAL LABORATORIES  
BERNALILLO COUNTY, NEW MEXICO  
EPA ID NO. NM5890110518



**HEARING OFFICER'S SUBSTITUTE PAGES**  
**FOR INTERLINEATION IN REPORT**

The Hearing Officer submits for the record and parties, the following pages for interlineation in her Report filed April 20, 2005, which correct typographical and other minor errors on pages 4, 5, 6, 8, 21, 24, 25, 26, 31, 33, 36, and 41.

Respectfully submitted,

  
Jennifer J. Pruett, Hearing Officer  
  
Dated

**CERTIFICATE OF SERVICE**

I certify that a copy of the foregoing pleading was mailed on May 26, 2005 to Louis Rose, Montgomery & Andrews, P.A., P.O. Box 2307, Santa Fe, NM 87504-2307; Amy J. Blumberg, Sandia Corporation, P.O. Box 5800, Albuquerque, NM 87185-0141; Michele A. Reynolds, U.S. Department of Energy, National Nuclear Security Administration, Sandia Site Office, P.O. Box 5400, Albuquerque, NM 87185-0184; Susan Dayton, Director, Citizen Action New Mexico, P.O. Box 262, Sandia Park, NM 87047; Abbas Ghassemi, Executive Director, WERC, P. O. Box 30001 MSC WERC, Las Cruces, NM 88003-8001; and H. Eric Nuttall, 1445 Honeysuckle Drive NE, Albuquerque, NM 87122.

  
Sally Worthington, Hearing Clerk



Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC and the Environment Department Permit Procedures ("Procedures"), 20.1.4 NMAC et seq.

#### SUMMARY OF TESTIMONY

A brief description of the testimony follows. I took testimony from the public several times a day during each day of the hearing, at times as requested by the public, to ensure that everyone had a full and fair opportunity to speak. The parties and public cooperated well in coordinating testimony, and allowed speakers from the parties and the public to testify out of order if required by time or travel restraints. In this Report, testimony is grouped according to position, rather than by chronological presentation.

#### For the Permit Holder, SNL

John Gould, of the Department of Energy ("DOE") first testified generally about the inventory of the contents of the landfill, the more than 10 years SNL has spent studying and characterizing the contents, and the considerations Sandia used in selecting a remedy of a vegetative soil cover. TR 33-40. Richard E. Fate of SNL gave background on the landfill: it operated from 1959 to 1988, and is 1 of 268 sites (of which 5 are landfills) on which Sandia's Environmental Restoration Project is working. He explained that the landfill itself, about 2.6 acres, contains 2 basic areas: 1) the classified area in the northeast portion of the landfill, typically contains pits about 10 feet in diameter and up to 25 feet deep that were each covered by a steel cap with a trap door and once closed, covered with a concrete cap about 12 feet by 12 feet by 6 inches; 2) the unclassified area, which contains trenches about 135 feet long, 35 feet wide and 15 feet deep, that were backfilled about once a quarter as they were being filled. TR 40-48.



Timothy J. Goering of GRAM, Incorporated, a contractor who has worked with SNL's Environmental Restoration Program on this landfill for about 12 years, gave more details about the landfill and its contents. Mr. Goering first described air sampling done in 1992, that showed no radionuclides above any air standards, with the vast majority being nondetect for plutonium. TR 53-60. Mr. Goering next discussed sampling programs performed at the landfill for the Phase 1 and Phase 2 RFIs, and levels of tritium and tritium flux detected. He described boreholes drilled in 1969, 1979, 1981, and 1982 and surface soil samples taken in 1982. These results showed tritium in surface and subsurface soils. In the Phase 1 RFI, soil sampling showed tritium at depths of 110 feet, where groundwater is nearly 500 feet below the surface. Mr. Goering's testimony indicated that a number of other volatile organic compounds ("VOCs") and semi-volatile organic compounds ("SVOCs") had been detected in subsurface soils, all orders of magnitude below any EPA action levels. Target levels of metals were within background levels. TR 59-65.

SNL's Phase 2 RFI (1992-1996) included geophysical surveys that determined that no wastes had been buried outside the landfill perimeter fence. The passive and intrusive soil-gas surveys showed, again, tritium in surface soils, with the highest concentrations in the classified area near Pit 33 (the pit where the largest quantity of tritium was disposed of), with concentrations decreasing in concentric circles moving away from this area. SNL detected tritium in surface soils outside the landfill fence to the east and to the north, up to a distance of approximately 100 feet. TR-66-78. In the southern half of the classified area, SNL had an Interim Storage Site ("hereinafter ISS") that operated between 1989 and 1996, where contamination above background of

Uranium-238, Plutonium-238 and Plutonium-239 was detected in soils. Follow-up sampling in 2001 confirmed low levels of plutonium in surface soils, but found only Plutonium-238 (no Plutonium-239 or Plutonium-240); no plutonium was found in subsurface soils. Mr. Goering testified that the most likely explanations for this plutonium are activities conducted at the ISS (either residual contamination on drums stored there, or a spill that was not entirely cleaned up), not the mixed waste landfill. TR 79-85, 105.

Again, the Phase 2 RFI surveys also detected low levels of VOCs and SVOCs, orders of magnitude below EPA action levels. The results indicated tritium in subsurface soils to depths of 120 feet, with highest levels below the classified area. The only metal above regulatory action levels was beryllium, which occurs naturally and does not originate from the landfill, according to Mr. Goering.

Mr. Goering next described the hydrogeology at the landfill site, noting that depth to groundwater varies between 468 to 495 feet below surface, flowing toward the west, with low hydraulic conductivity (0.17 feet per year) in shallower wells due to tight materials in the formations, and higher in deeper wells (18.5 feet per year). SNL has sampled groundwater since 1989, at first quarterly, then reduced to semiannually as they detected no evidence of contamination. Currently, SNL samples annually. TR 98-101.

Referring to a study by Baskaran on uranium ratios in groundwater, Mr. Goering noted that SNL's January 2001 studies of groundwater samples showed exactly the uranium ratios predicted, indicating that uranium occurs naturally in the groundwater at the mixed waste landfill, as it does throughout the Albuquerque Basin (not as a result of



stated that liquids were put in the landfill, written in the mid to late 1970s and the 1990s, but Sandia now asserts that these records are not correct and that liquid wastes were not put into the landfill. TR 108-12. Mr. Fate also asserted that Sandia has a good inventory of the contents of the landfill, based on a large body of historical records, photographic records, interviews with former employees and the characterization results, all of which support each other. TR 112-14. For approximately 3 hours, Richard Kilbury of NMED studied Sandia's inventory records for the landfill, and traced randomly-selected disposal records from the late 1950s to 1989 to the current unclassified waste disposal sheets. Mr. Kilbury was able to successfully trace all 36 records he targeted, gaining confidence in the published inventory and that all classified waste was in fact contained in the unclassified inventory (without specific names of the project names and places or weapon numbers). NMED Exhibit 15. On cross and re-direct, Mssrs. Fate and Peace testified that several earlier memos Sandia had produced were incorrect, and that later data, interviews and NMED analysis all concluded that no high-level waste was placed in the landfill. TR 424-53.

Mark Miller, a health physicist employed at SNL, discussed the half lives of several of the components of the landfill. TR 120-22. He noted that tritium is a major contaminant at the landfill, is the most mobile, and has a short half-life (resulting in its rapid decay). Sandia calculated doses from landfill sources for on-site workers and to residents of Zia Park housing, that were far lower than the background radiological dose in Albuquerque of 360 millirems per year. TR 122-24.

Mike Nagy, a SNL contractor for risk management, testified about the risk assessment in Sandia's Corrective Measures Study, which was based on NMED and

times, it requires a homogenized landfill (rather than the use of discrete data points). TR 615. He agreed with Ringelberg that when Sandia got measurements they thought were too high or in error, they did new measurements which were lower. Testing high samples until they are lower is not random, and underestimates the presence of contamination. TR 616-17.

Dr. Resnikoff testified about several sites (including Lake Ontario Ordnance Worksite in upstate New York, uranium mining sites in Elliott Lake, Canada, and Karnes, Texas) where institutional controls were lost within 30 years, allowing waste facilities to be breached and people to be exposed to radionuclides. He charged that institutional controls can not ensure that the public, such as inquisitive children, are not exposed to the landfill's contents. He has also noted what he believes is a trend of the government selling off former weapons facilities. So, Dr. Resnikoff alleged that the risk assessment should have considered risks to resident individuals after institutional controls are no longer in force. Last, he alleged that the risk assessment has failed to consider the synergistic effect of chemicals within the landfill mixing. TR 617-19.

Dr. Resinkoff strongly criticized Sandia for failing to assess disposal of liquids at the landfill. He noted Sandia documents that revealed that almost 19 million gallons of liquids were put in at Technical Areas 3 and 5, that created a water mound that may have interacted with waste at the landfill. TR 619-20. On cross-examination, he agreed that the groundwater mound was not under the landfill, and he was not certain how close it is to the landfill or its waste. TR 664-65, 93-94.

At the Beatty, Nevada landfill site, Dr. Resnikoff pointed out that tritium has contaminated groundwater (357 feet below ground surface) and moved off-site within 35



CFR 264.111, incorporated into NM Hazardous Management Regulations), but simply covers the landfill, requires perpetual active maintenance, and leaves hazardous waste constituents in place. TR 736-37. On cross-examination, Mr. Robinson admitted he was not a legal expert in RCRA, and appeared somewhat confused about exactly which RCRA requirements applied to the site and remedy selection process. TR 867-71.

Robinson urged NMED to withdraw approval of the CMS Report, and that it require a financial guarantee from Sandia, based on a model such as the trust fund for the mixed waste landfill at Oak Ridge, TN, which DOE agreed to voluntarily. TR 738-40. Mr. Robinson completed a report titled, "'Is Trust Us, We're the Government' Really a Guarantee?, a Review of Financial Assurance Options" dated June 18, 2002 that reviewed several other government sites where financial assurance mechanisms were used. He was concerned that if NMED were to order Sandia to excavate the site in the future, this might not be accomplished if no financial assurance mechanism has been required. Although RCRA does contain an exemption for the federal government for financial assurance requirements (40 CFR 264.140(c)), he noted several examples that have nonetheless been used, including: trust funds at closed uranium mill tailings disposal sites (UMTRA); trust funds for RCRA closure and post-closure plans (and state oversight costs) for a mixed waste landfill at Oak Ridge, TN; financial assurance from non-governmental operators such as at the Waste Isolation Pilot Plant (WIPP) in New Mexico; and private operator corporate insurance, used by the Oregon Department of Environmental Quality for the Umatilla Chemical Weapons Depot. TR 816-24, 855-58, Citizen Action Exhibit 10, p. 1-2. On cross-examination, Mr. Robinson acknowledged that NMED may already be receiving funds to oversee compliance at

DOE facilities, TR 857-58, and that the Oak Ridge agreement occurred at a CERCLA site, not a RCRA one, TR 876-77.

Mr. Robinson criticized the proposed remedy as less protective of human health and the environment than those required for Sandia's chemical waste landfill and classified waste landfill. At the chemical waste landfill, that contained a similar mix of constituents, 53,000 cubic yards of soil and debris were excavated, taken to a corrective action management unit ("CAMU") for treatment or placed in a containment cell for long-term monitoring or disposal off-site. The classified waste landfill (which also contained similar constituents of concern) was excavated, separated and treated, and Sandia proposes to return the majority of the 50,000 cubic yards excavated to the site for backfill. TR 740-42.

Mr. Robinson was highly critical of the costs estimated in the CMS Report. He alleged that the estimates failed to include indirect costs, and are not supported by accurate data or based on actual corrective measures and closure experience at SNL (such as the chemical waste landfill). TR 742-43. In Mr. Robinson's report dated March 30, 2004, he reviewed cost estimates in the CMS Report (which he alleged failed to provide reference material, citations or authors). The CMS Report references fail to identify any information from either the chemical waste landfill or the radioactive and hazardous waste facility. Further, he alleged that the highest costs for each of the excavation alternatives do not have specific or cited supporting cost data. TR 748-53, AR 04-037, Citizen Action Exhibit 10. Robinson cited Sandia reports that contradict cost information in the CMS, and which he alleged provide costs that are one-seventh to one-seventieth of costs estimated in the CMS. TR 754-56. He also criticized Sandia's



failure to include opportunity costs associated with what he termed "the failure of SNL to commit to excavation and clean closure" of the landfill. TR 758-61. In discussing cost estimates in the CMS, Robinson compared land values to those in North Albuquerque Acres, arguing that Sandia had substantially undervalued the landfill, and that lost opportunity costs were sacrificed to an inexpensive remedy. TR 827-31. Were Sandia to excavate the landfill, the lost opportunity costs of the buffer zone would not be necessary, as the buffer area could be developed. TR 848-50.

Mr. Robinson also compared voluntary corrective measures that Sandia took at the chemical waste landfill to those at the mixed waste landfill, which he alleged were far less extensive. TR 744-47. He noted that while tritium is a consistent finding and topic of discussion for the mixed waste landfill, other hazardous and radioactive materials are not discussed much. TR 748. Robinson also discussed groundwater sampling results, which he feels may indicate possible release of contaminants such as cadmium TR 757-59.

Mr. Robinson noted that institutional controls are critical to the remedy proposed in the permit modification, but alleged that they cannot be relied on for more than 100 years. For this reason, he charged that the proposed remedy is only a temporary remedy. He testified that 100 years is an "insignificant" period of time when dealing with the hazards present in the landfill. TR 762-66. Robinson questioned the CMS risk assessment concerning dangers to workers from excavation, particularly as SNL's chemical waste landfill was excavated without injury or incident. TR 766- 68.

In characterizing the containment at the landfill, Mr. Robinson noted that much of the waste was deposited in plastic garbage bags into unlined trenches left open for

permit and the Consent Order entered into by NMED and DOE/Sandia, signed April 29, 2004 ("Consent Order"). Most of 40 CFR Part 264 does not apply because the landfill is not a Part B permitted facility, and 40 CFR 265 does not apply because Sandia did not include the landfill in its Part A interim status permit. However, the requirements NMED has imposed on the landfill are similar to, and equally protective of, human health and the environment, were it regulated under Parts 264 or 265. Although Moats testified that NMED's "regulatory time line" is 30 years, based on RCRA's postclosure care requirements in 40 CFR 264.117(a)(1), he noted that 40 CFR 264.117(a)(2)(ii) allows NMED to extend this time period if necessary to protect human health and the environment. Should future monitoring results indicate a threat to groundwater or continued/increased levels of tritium or other contaminants, NMED can extend the post-closure care period. TR 967-76.

Mr. Moats reviewed the findings of the Phase 1 and 2 RFI reports, noting that at the landfill, radioactive wastes, rather than chemical wastes, pose the most acute threat to human health and the environment. He outlined and reviewed levels of radioactive and other contaminants found at the landfill in soil, air and soil gas, and re-asserted NMED's conclusions that: 1) the levels do not represent unacceptable risk to human health or the environment under an industrial land use scenario, and 2) the levels do not represent a risk to groundwater. Like Ms. Cooper, Mr. Moats testified there is no evidence of groundwater contamination at the landfill. TR 978-987.

Refuting allegations by witnesses for Citizen Action that the landfill is likely to contaminate groundwater like other DOE sites, Mr. Moats asserted that the other sites mentioned (Sandia liquid waste disposal system, chemical waste landfill, Tijeras Arroyo



with off-site disposal, even though it did not pass initial screening, as a result of public input and concern. TR 1008-19.

Mr. Moats then reviewed NMED's authority for Sandia's draft permit under RCRA and delegations from EPA, and the regulatory history of the CMS. He outlined the provisions of the draft permit and how they will guide the design and implementation of the remedy, as well as long-term maintenance and monitoring. TR 1064-73. In response to Citizen Actions' urging that NMED require Sandia to post financial assurance for the remedy, Moats noted that DOE and Sandia Corporation are exempted from these requirements by federal law. TR 1074. He also refuted Dr. Resnikoff's allegations that DOE's long-term stewardship program cannot be counted on to maintain the cover for the landfill or institutional controls, by pointing out NMED's enforcement options in Sandia's RCRA permit. TR 1975.

Mr. Moats effectively responded to Dr. Baskaran's report and conclusions by quoting updated information and other sampling not used by Dr. Baskaran, that demonstrated that contaminants from the landfill have not contaminated groundwater. TR 1076-85. Moats also reviewed Mr. Robinson's 2001 report and NMED's contrary conclusions that sporadic detections of acetone and phenolics are not groundwater contamination. TR 1085-87. In response to Dr. Hakonson's report, Moats noted that several of his conclusions agreed with NMED's (cover would be adequate to prevent migration of water, and biointrusion can interfere with covers). TR 1088-90.

In discussing WERC's first peer review report, Moats outlined the many areas where WERC and NMED agree, particularly regarding the high quality of Sandia's data and the conclusion that there have not been releases that currently pose an

discussed in the course of design and implementation of the remedy, once it is selected. However, it is premature to decide and detail many of those matters at this time.

### *Remedy Selection*

NMED presented a convincing argument for the remedy it included in the draft permit modification: a vegetative cover with bio-intrusion barrier. The presence of animals and other biota with tritium in their tissues above background levels convinced me that the bio-intrusion barrier should be required. If the remedy performs as predicted and if the contents of the landfill behave as predicted, this remedy should protect human health and the environment.

Citizen Action presented a convincing argument that Sandia had over-estimated the costs of excavation (both currently and in the future), although I cannot go as far as Erik Ringelberg and term excavation at the landfill a "bargain," even as compared to another site. However, the costs of excavation are only one part of remedy selection, and the evidence did not convince me that the selected and proposed remedy was not protective of human health and the environment. More accurate cost estimates might come into play when re-evaluating the need for excavation in the future.

### *Triggers for Action and Re-Evaluation of Excavation in the Future*

Much of the public testimony and that of Citizen Action focused on concern about future degradation of conditions at the landfill. Sandia's, WERC's and NMED's witnesses consistently testified that current excavation of the landfill would pose unacceptable risks to the people performing this activity, and to the public and the environment in general if the excavated waste is transported off-site. However, these witnesses also agreed that radioactive (and some hazardous) constituents of the landfill



listing of the contents of the landfill over time, and even rejected a study by its consultants, claiming the improved information is the result of additional research and interviews with former employees.

I found NMED's testimony credible, and for the most part I was impressed with the detailed efforts and studies from both Sandia and NMED showing that high-level radioactive waste was not buried at the landfill. Given the length of time this landfill has been documented and studied, it makes sense that not all documentation is accurate. However, I was troubled by the Kilbury study in July 2000, which acknowledged that only 3 hours were spent comparing and tracing 36 items in landfill records that otherwise would take months to study. From this small sampling of records, NMED concluded that the classified records were sound and Sandia knew how much of what went into the landfill over time. I was not convinced that enough was done in this area to verify these records and inventory, particularly given the significant amount of controversy surrounding the inventory raised by Citizen Action's witnesses, the WERC panel and the public. However, in spite of this, based on NMED's and Sandia's testimony, I had to agree that there is a reasonably accurate and complete inventory for the landfill, and that more is known about this landfill than about many other historic landfills.

#### *Adequacy of CMS Report and Risk Assessment*

NMED and the WERC panels consistently found Sandia's risk assessment adequate, and the quality of work in the CMS Report to be of high quality. (See WERC, 8/31/01, General Conclusion #7). The risk assessment, testimony and reports support